GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. _____

Project No./(Center No.) E-16-535 (05707-0A0) ~~GTRC~~/GIT DATE 7 / 15 / 87

Project Director: Dr. N. L. Sankar School/~~Lab~~ AE

Sponsor: Lockheed-Georgia Company

Agreement No.: Purchase Order No. EC69363

Award Period: From 1/1/87 To 12/31/87 (Performance) 12/31/87 Reports

Sponsor Amount:	New With This Change	Total to Date
Contract Value:	$ 10,000	$ 10,000
Funded:	$ 10,000	$ 10,000

Cost Sharing No./(Center No.) N/A Cost Sharing: $ None

Title: Graduate Student Research Grant

ADMINISTRATIVE DATA OCA Contact Brian J. Lindberg x. 4-4820

1) Sponsor Technical Contact:

Jim Trapnell
Lockheed-Georgia Company
86 South Cobb Drive
Mail Zone 630
Marietta, GA 30063
425-4597

2) Sponsor Issuing Office:

Military Security Classification: N/A
(or) Company/Industrial Proprietary: N/A

ONR Resident Rep. is ACO: _____ Yes X No
Defense Priority Rating: N/A

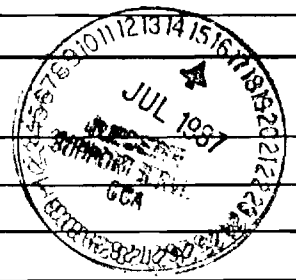
RESTRICTIONS

See Attached N/A Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with N/A

COMMENTS:



COPIES TO:

SPONSOR'S I.D. NO. 02.261.007.87T470

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Contract Support Div. (OCA) (2) P.H.
Research Communications
GTRC
Library
Project File
Other _____

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date 6/3/88

Project No. E-16-535 School/~~Lab~~ AE

Includes Subproject No.(s) N/E

Project Director(s) N. L. Sankar GTRC/GIT

Sponsor Lockheed-Georgia

Title Graduate Research Fellowship

Effective Completion Date: 12/31/87 (Performance) 12/31/87 (Reports)

Grant/Contract Closeout Actions Remaining:

- [ ] None
- [x] Final Invoice or Copy of Last Invoice Serving as Final
- [ ] Release and Assignment
- [ ] Final Report of Inventions and/or Subcontract:
  Patent and Subcontract Questionnaire sent to Project Director [ ]
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Continues Project No. _____ Continued by Project No. _____

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Program Administration Division
Contract Support Division
Facilities Management - ERB
Library
GTRC
Project File
Other _____

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

SCHOOL OF
AEROSPACE ENGINEERING

404.894.3000

DANIEL GUGGENHEIM SCHOOL
OF AERONAUTICS

February 3, 1988

Dr. John B. Malone
Acting Manager
Advanced Flight Sciences Department
Dept. 72-74, Zone 403
Lockheed Aeronautical Systems Co.
Marietta, GA 30063

Subject: Final Report on Research Performed Under Lockheed Georgia Research Fellowship in the School of Aerospace Engineering

Dear Dr. Malone:

During the period January 1, 1987 through December 31, 1987, two of my graduate students (Mr. Brian E. Wake and Ms. Jamie Burnette) were supported under the Lockheed Georgia Fellowship program. Mr. Wake graduated at the end of April 1987 and was supported during the period January 1 - April 30, 1987. Ms. Jamie Burnette, a M. S. student, was supported during the period September 1 - December 31, 1987. This letter summarizes the progress made during the reporting period in the Lockheed Fellowship program. I request that this letter be viewed as the final report for the above project.

A 3-D compressible Navier-Stokes solver, capable of computing viscous flow past helicopter rotor blades and aircraft fixed wing configurations, was developed as part of this research. The latest version of the computer code was made available to interested Lockheed scientists for adaptation into their own research. The following publications resulted out of this research:

1. Wake, B. E., "Solution of the Navier-Stokes Equations Applied to Rotors," Ph.D. Thesis Dissertation, Georgia Institute of Technology, April 1987.

2. Wake, B. E. and L. N. Sankar, "Solution of the Navier-Stokes Equations for the Flow About a Rotor Blade," Proceedings of the American Helicopter Society National Specialists Meeting on Aerodynamics and Aeroacoustics, February 1987.

Since the mathematical and numerical formulation of the flow solver and code validation studies are well documented in the above publications, this information is not repeated here.

The present research contributed to Lockheed Georgia's inhouse research on unsteady aerodynamics, and the following joint publications resulted:

1. Wake, B. E., Sankar, L.N. and Ruo, S.Y., "An Efficient Procedure for the Numerical Solution of Three-Dimensional Navier-Stokes Equations," Proceedings of the AIAA Computational Fluid Dynamics Conference, June 1987.

2. Ruo, S. Y., "Euler Calculations for Wing-Alone Configuration," to appear in Journal of Aircraft, March 1988. (Also published as AIAA Paper 87-0108.)

I am making copies of the above publications available to interested scientists at Lockheed Aeronautical Systems Company.

I would like to thank Lockheed Corporation for making this fellowship available during the past three years.

Sincerely yours,

Lakshmi N. Sankar
Associate Professor
School of Aerospace Engineering

LNS/ed
sltr.057